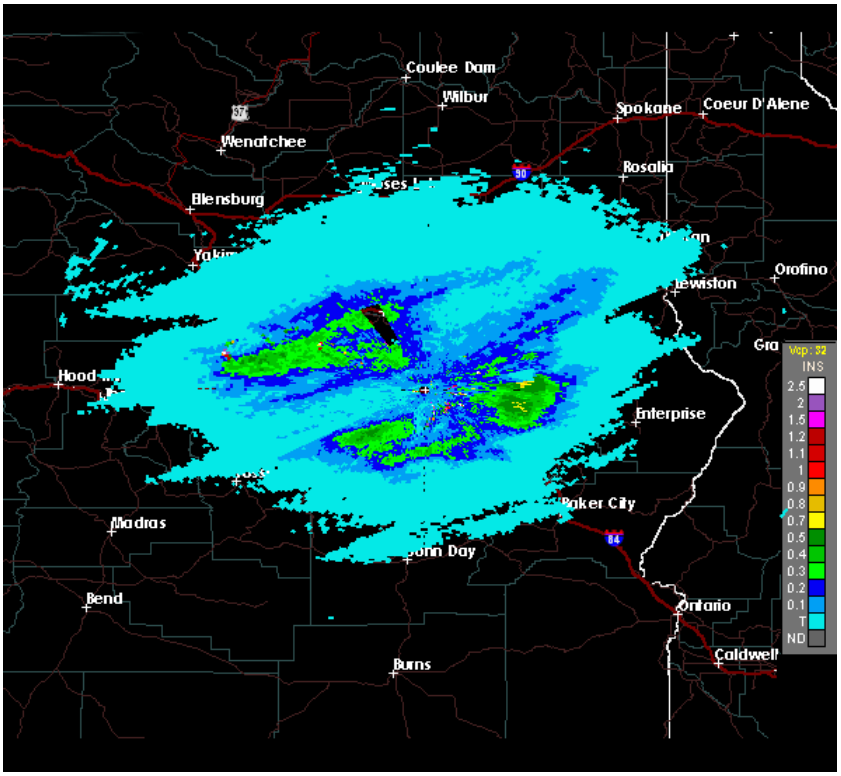
Heavy Snow and Arctic Air
Nov. 21-24 2010

Summary

A modified Arctic air mass moved south out of western Canada through the Pacific Northwest during the week leading up to Thanksgiving 2010.

A series of weather systems brought moisture from the Pacific Ocean and created periods of heavy snow for northeast Oregon and southeast Washington from Sunday November 21 through Tuesday morning, November 23. Snow bands over portions of the lower Columbia Basin created periods of heavy snow Sunday night and Monday evening. A radar image of snow bands over the Columbia Basin at 4 pm PST on Monday, November 22 is shown below. Southeasterly downslope winds in the lee of the Blue Mountains converged with northerly surface winds in the Columbia Basin. This surface convergence helped create the southwest to northeast bands depicted below (green shading).



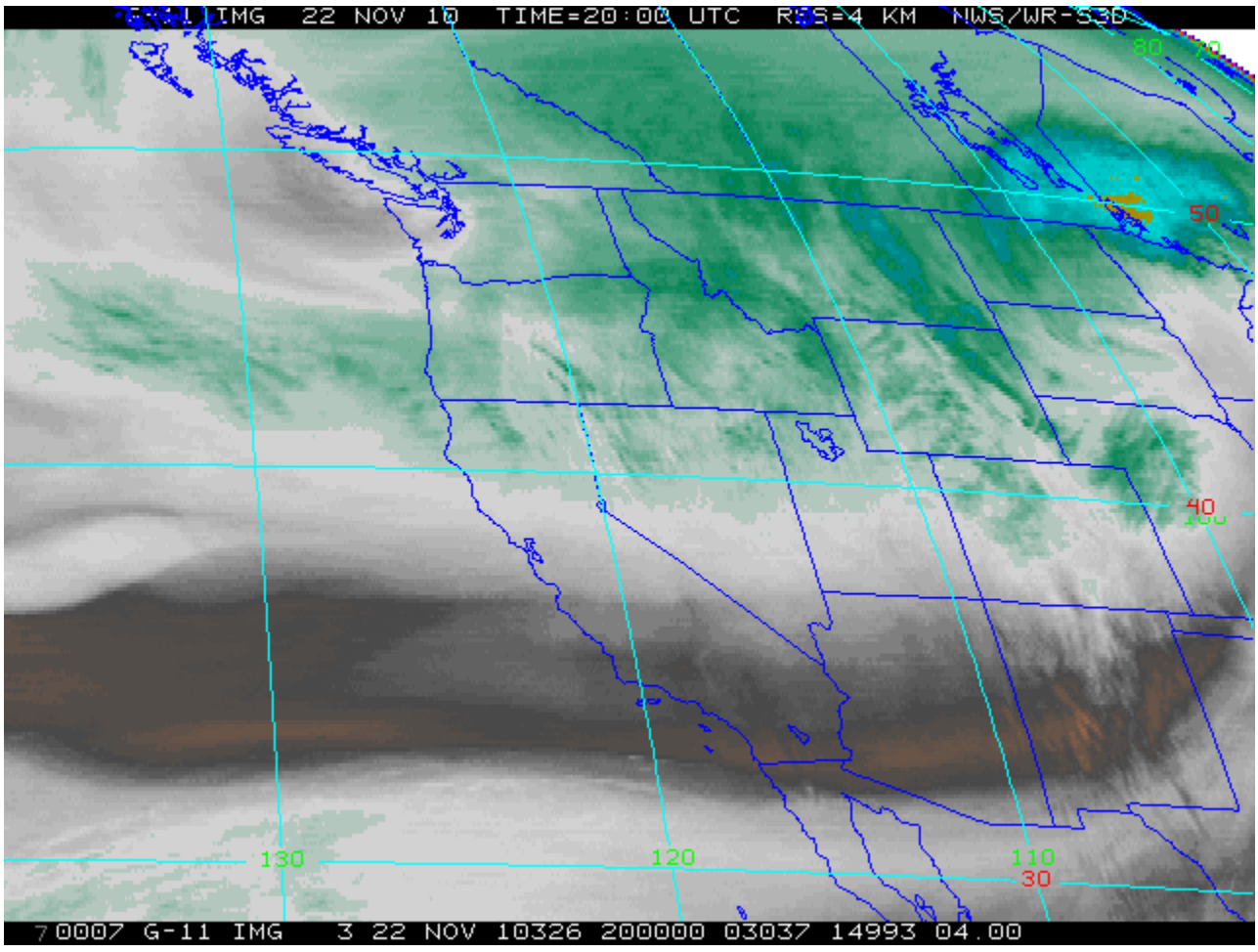
Some locations in the Tri-Cities, WA area received storm totals greater than 8 inches, an unusual event especially for November.

Some mountain locations received storm total amounts up to 18 inches. Click here: Storm Reports for reports received during the event.

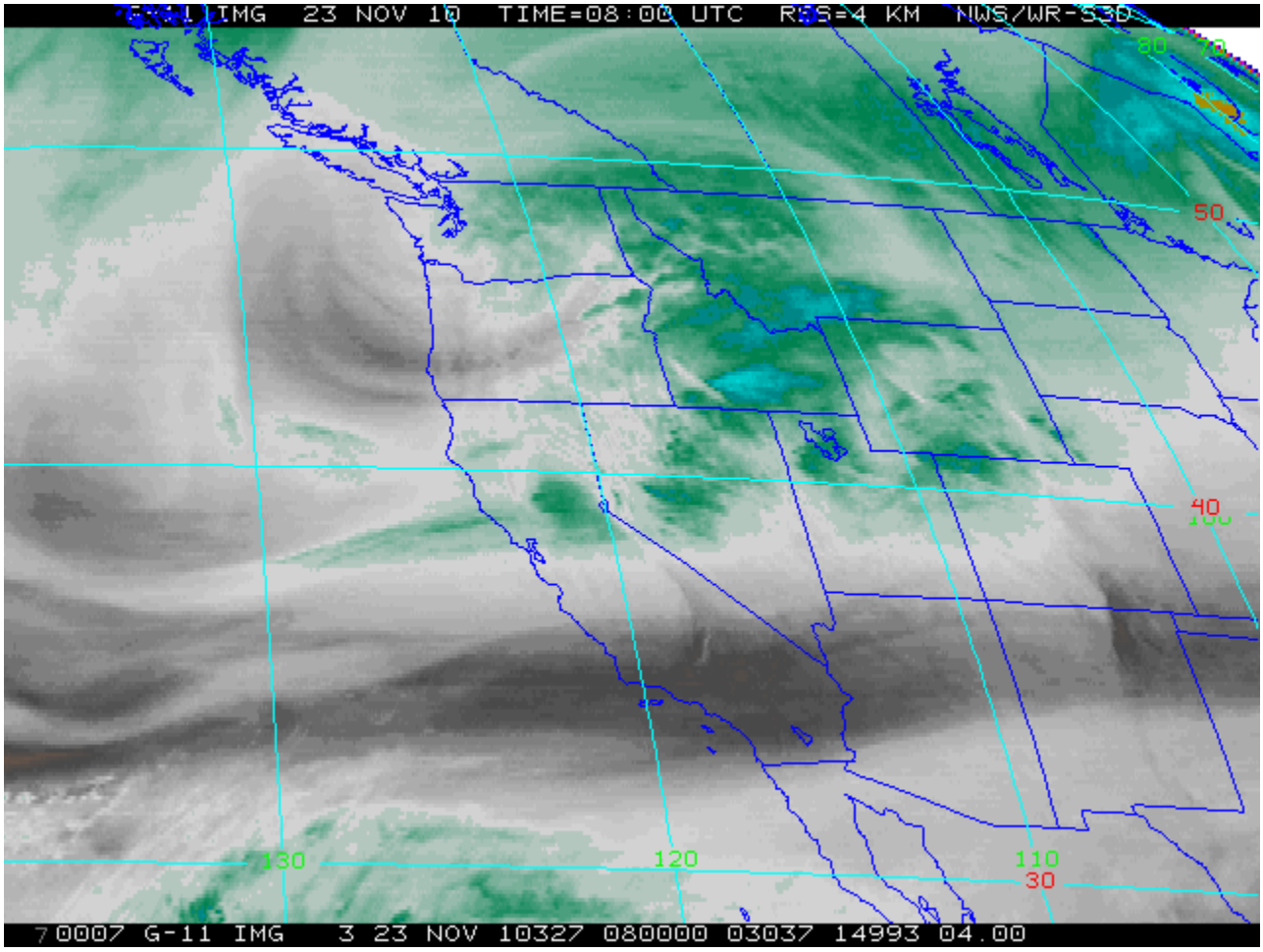
Clearing skies and light winds allowed the modified artic ar mass to cool rapidly Tuesday night. Some notable minimum temperatures Wednesday morning, November 24 (in degrees Fahrenheit) included Bend, OR (-9), Yakima, WA (-10), and Whitman Mission, WA (-11). Some mountain valleys were colder, for example Seneca, OR (-19) and Meacham, OR (-24).

Water Vapor Satellite Images

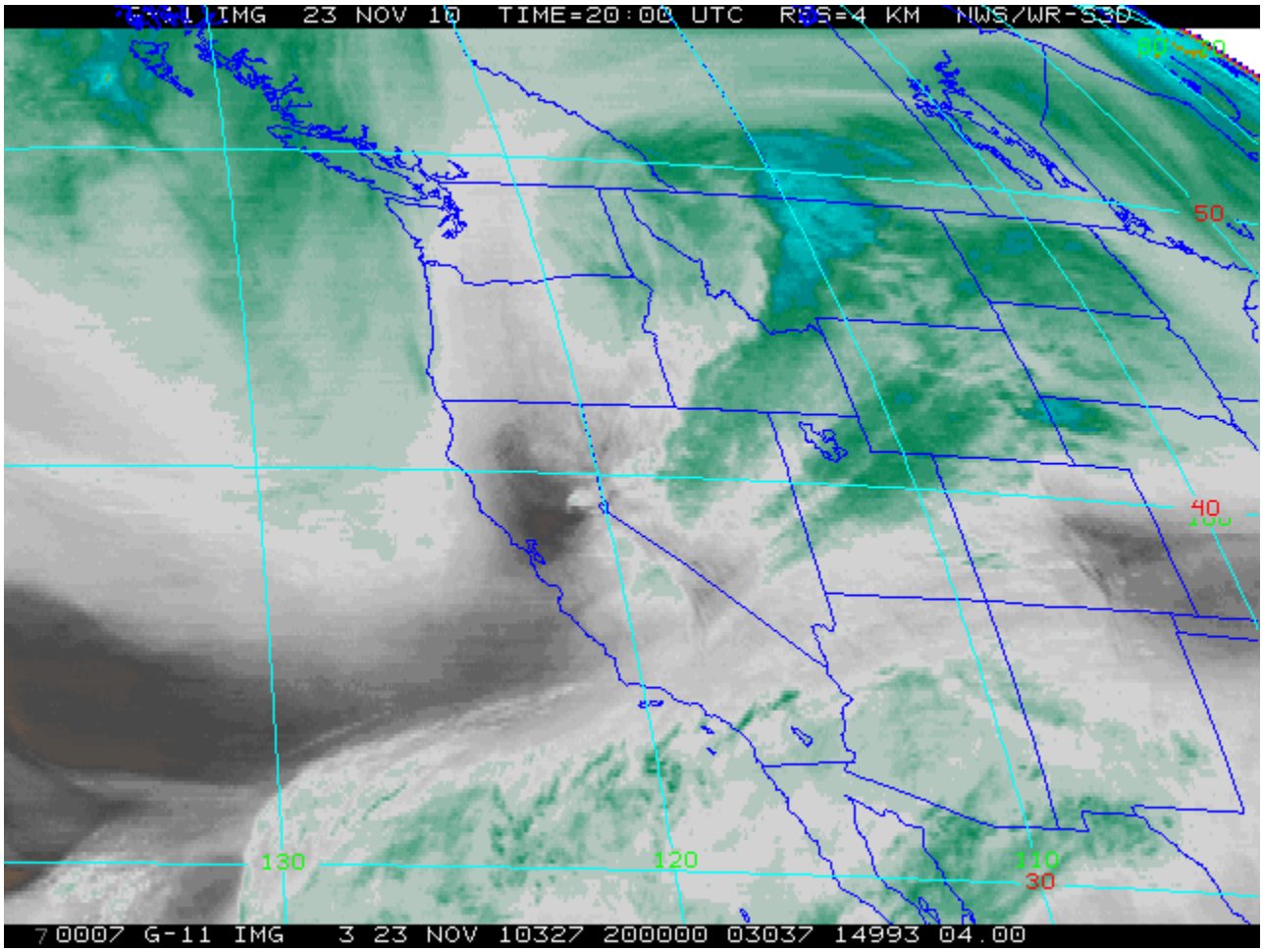
The sequence of satellite images below shows the weather system moving from western Canada southeast across the Pacific Northwest. These are water vapor satellite images which show the location of moisture in the upper half of the troposphere (green shading indicates atmospheric moisture). The image below is from 4 am PST on 22 November 2010 showing the center of a low-pressure circulation over Vancouver Island.



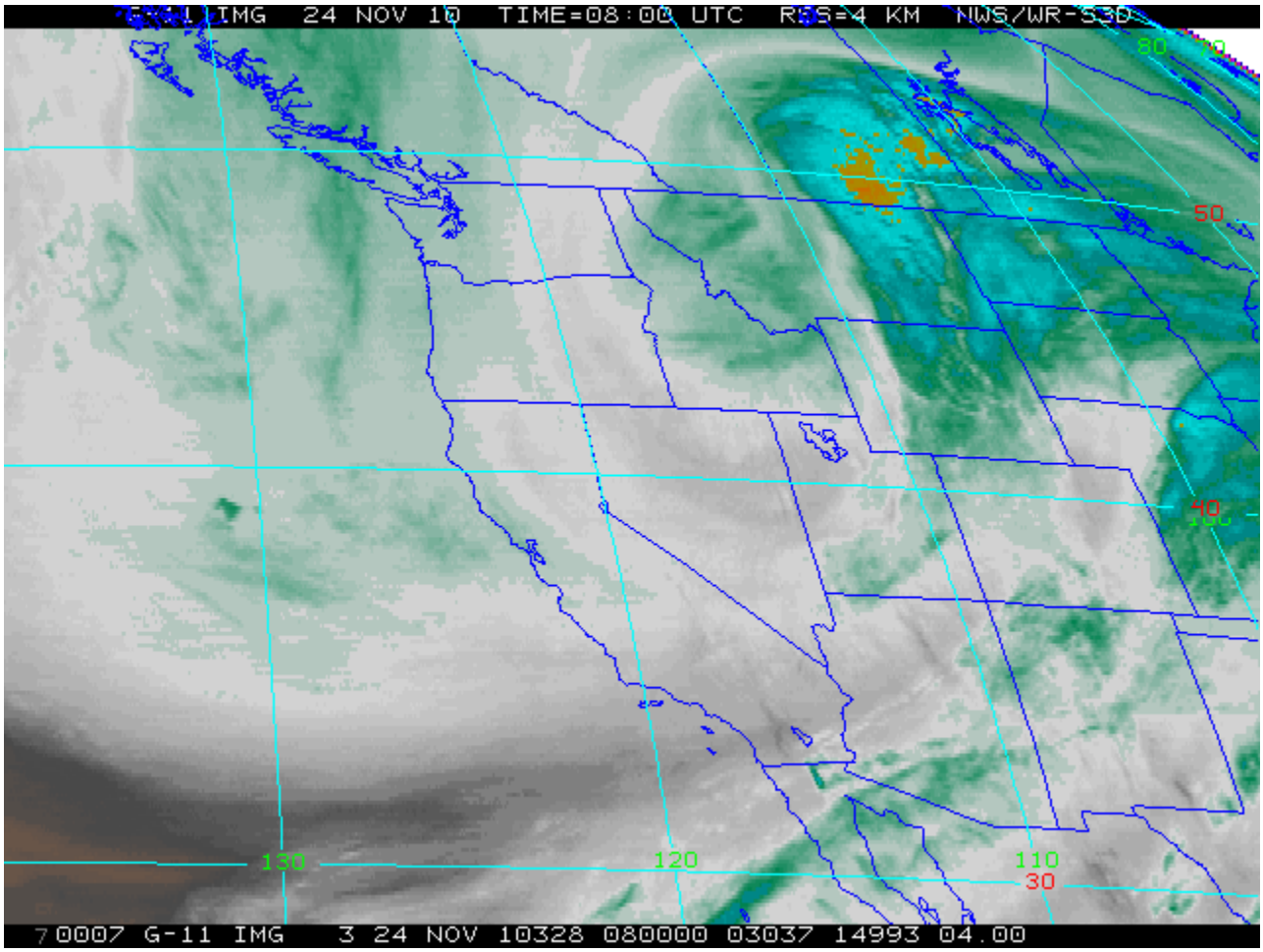
The next image, from 4 pm PST on 22 November, shows the center of the circulation had moved over eastern Washington.



The next image, from 4 am PST on 23 November, shows the center of the circulation has moved over the Idaho pandhandle.

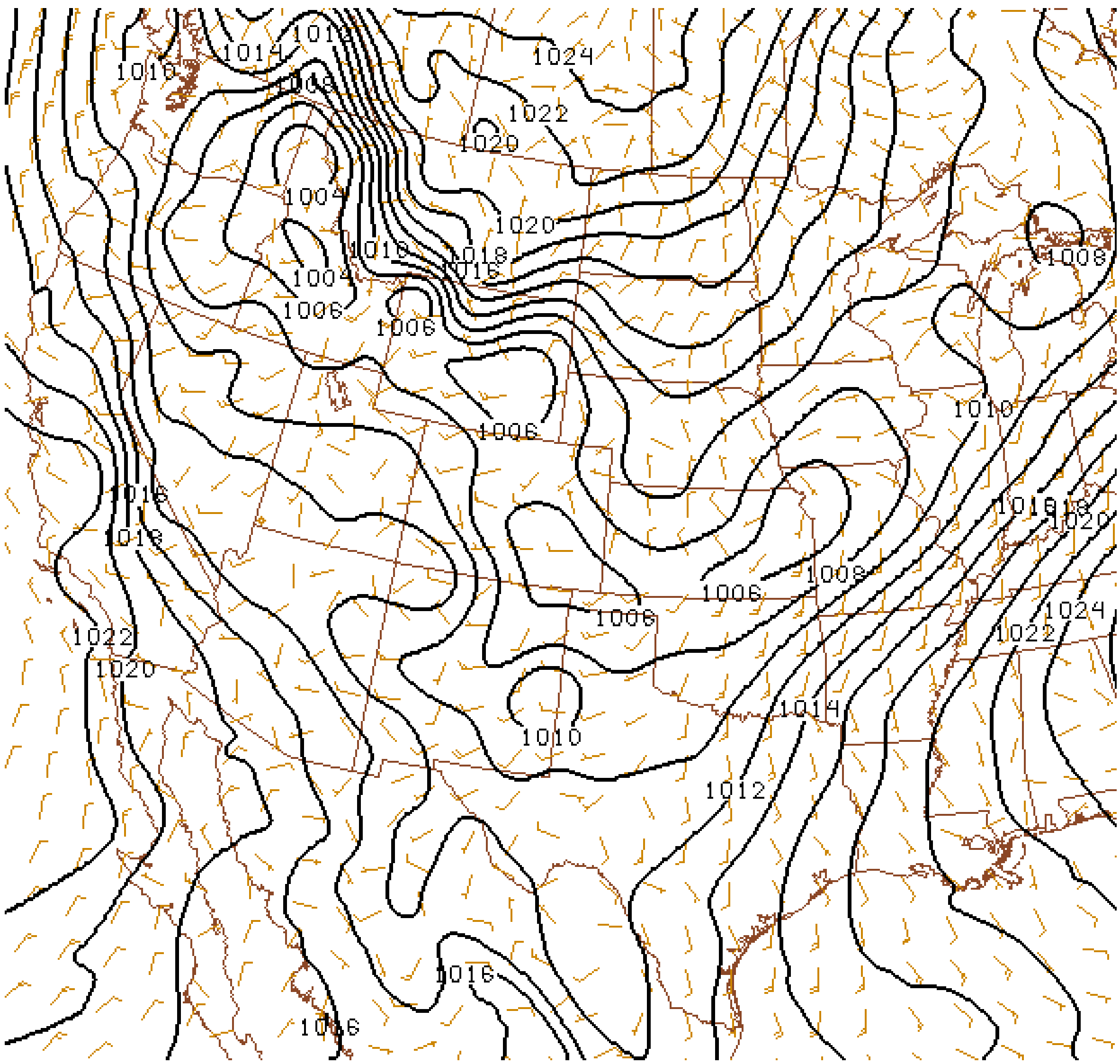


The next image, from 4 pm PDT on 23 November, shows drier air over the interior Pacific Northwest, setting up conditions for a very cold night Tuesday night.



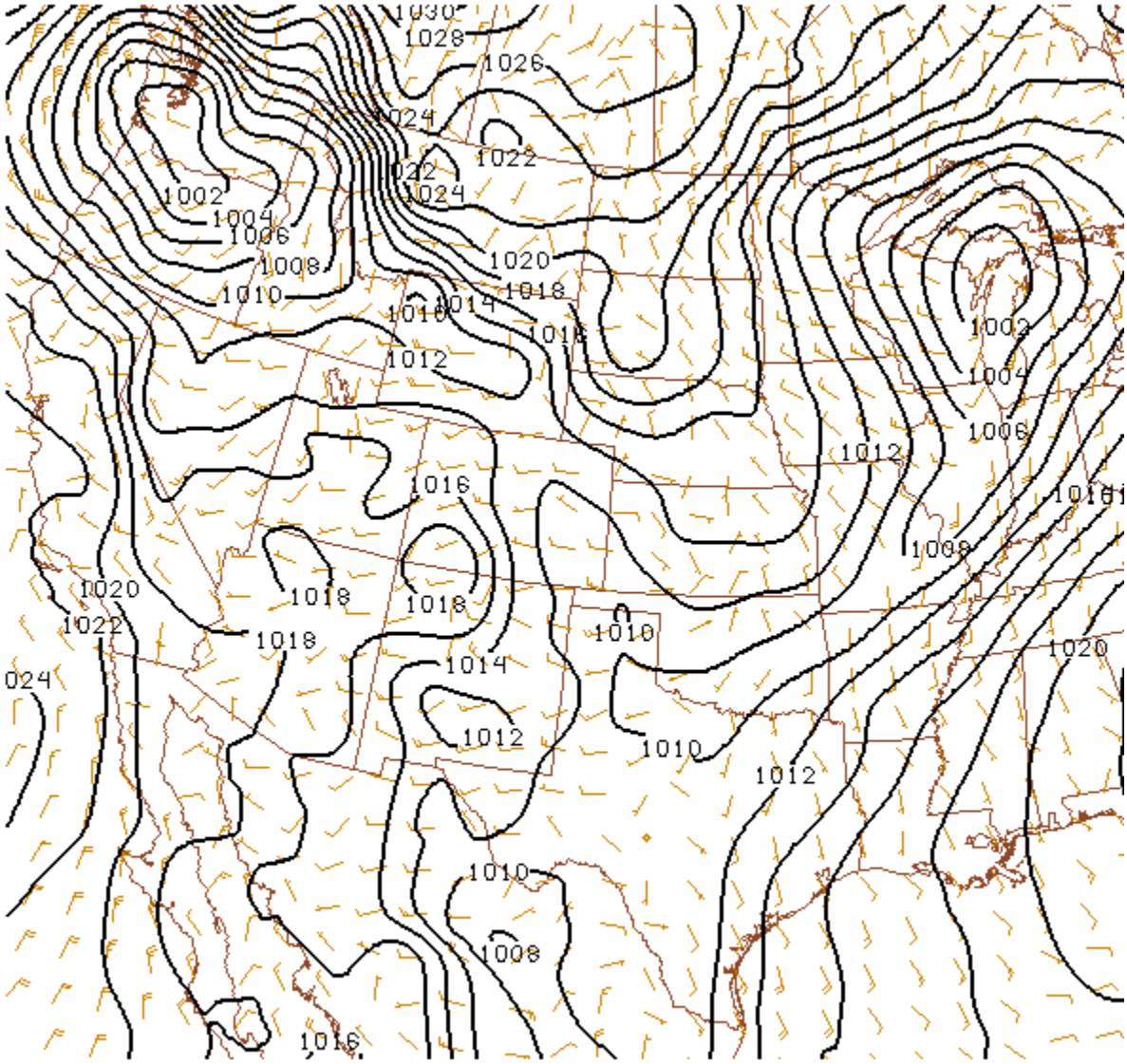
Sea-level Pressure Charts

Sea-level pressure changes rapidly with distance across an arctic air mass boundary. The arctic air mass boundary (cold front) is easily identified on the sea-level pressure chart below over the Rocky Mountains and a weaker boundary is evident north of the Washington/Canada border. The time of this chart, 4 am PST, 22 November, corresponds with the time of the first satellite image above.

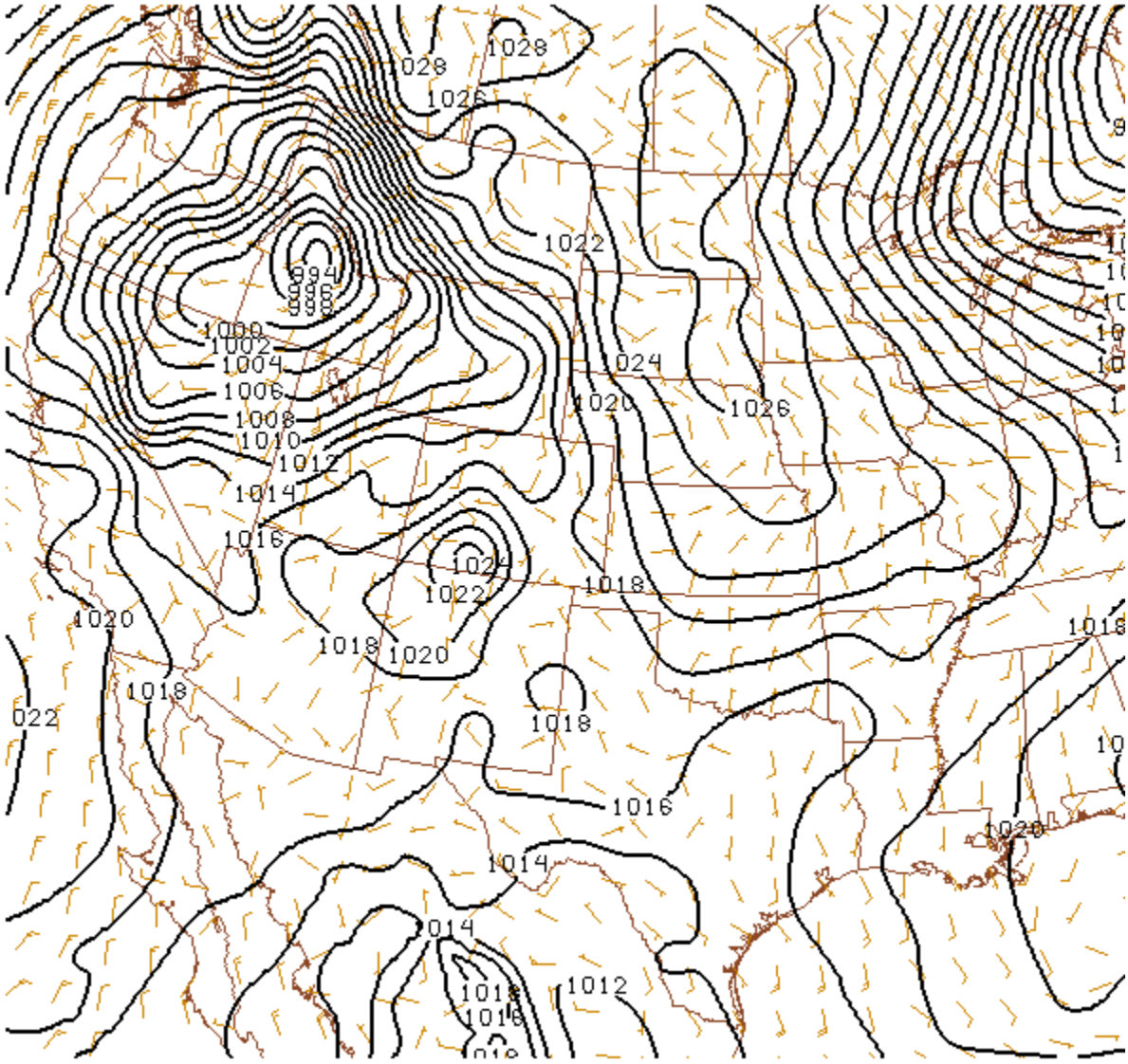


101122/1200 MSL Pressure and surface wind

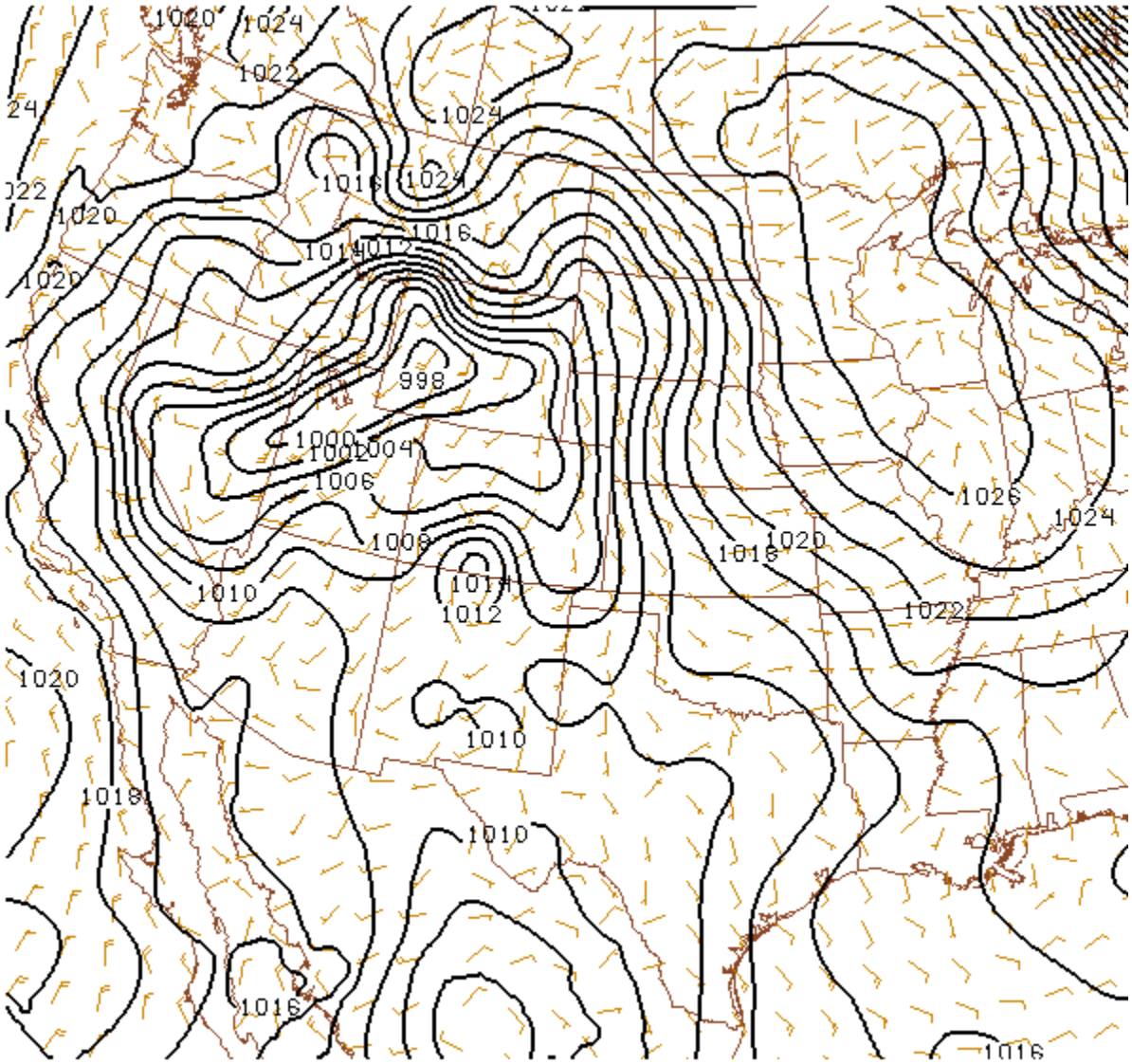
The next chart, from 4 pm PST, 22 November, shows a strong boundary over eastern Washington as the cold air has moved southward out of western Canada.



The next chart, from 4 am PST, 23 November, shows the cold front has moved to the southeast corner of Oregon, and the last chart (below) shows the front positioned over northern Utah.



The final chart of this summary (shown below), corresponds in time with the last satellite image in the sequence shown above. This concludes this summary of a major winter storm, November 21-24, 2010.



101124/0000 MSL Pressure and surface wind